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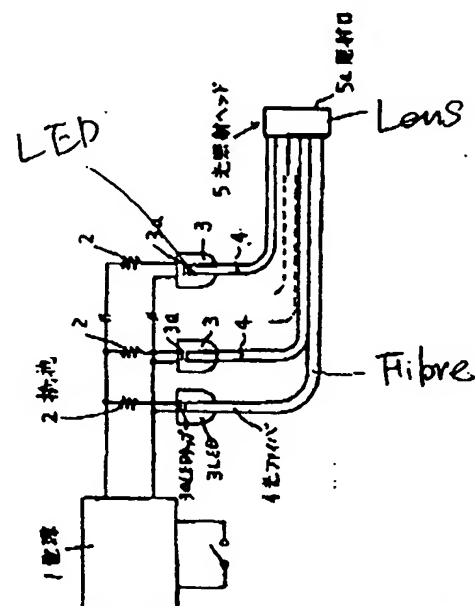
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【発明の名称】 光重合型レジン硬化用光源装置

(57) 【要約】

【目的】 光重合型レジンの重合が充分となり、安全で、光源の劣化がなく、熱的問題がなく、軽くてコンパクトな光重合型レジン硬化用の光源を提供する。

【構成】 ピーク発光波長が430～480nmの範囲である光を発光する複数のLED（発光ダイオード）3と、当該LED3より発光された光を集光する光学系手段であって、一端を束ねられ光照射ヘッド5を形成する光ファイバ4とを設け、前記光照射ヘッド5から出力された光が、光重合型レジンに照射される。



【産業上の利用分野】

本発明は、歯科材料として用いられる光重合型レジンを硬化させるための光源装置に関する。

【作用】

発光ダイオードから出力された光は、光学系手段によって光照射ヘッドに集光される。この光は、光照射ヘッドを経て、当該光照射ヘッドの他端である照射口から射出される。そして、当該出力光が患部に塗布した光重合型レジンに照射されることにより、光重合型レジンが重合する。

【特許請求の範囲】

【請求項1】 ピーク発光波長が430～480nmの範囲にある複数の発光ダイオードと、これら発光ダイオードの光を集光する光学系手段と、この光学系手段で集光された光を出力する光照射手段とによって構成したことを特徴とする光重合型レジン硬化用光源装置。

【図1】本発明の一実施例である光重合型レジン硬化用光源装置の概略構成を示すブロック図で、光ファイバ系として光ファイバを用いた例を示す。

【図2】本発明の他の実施例である光重合型レジン硬化用光源装置の概略構成を示すブロック図で集光光学系として集光レンズを用いた例を示す。

【図3】本発明の他の実施例である光重合型レジン硬化用光源装置の概略構成を示すブロック図で紫外光光学系として凹面鏡を用いた例を示す。

【図4】従来の光源装置で得られる光の分光スペクトルと、本発明実施例の光源装置で得られる光の分光スペクトルと、カンファークニンの吸収波長帯との関係を示す図である。

Figure 1 is a line graph showing the fluorescence spectra of various samples. The x-axis is labeled '波長 (nm)' (Wavelength in nm) and ranges from 350 to 650. The y-axis is labeled '発光力' (Fluorescence intensity). Five curves are shown, labeled A through E. A vertical dashed line is drawn at 430 nm, labeled 'CAの吸収波長 430-430nm'. The legend indicates: A (solid line) is '純水' (Pure water), B (dashed line) is '光線露置' (Exposure to light), C (dashed line) is '光線露置' (Exposure to light), D (dashed line) is '光線露置' (Exposure to light), and E (solid line) is '光線露置' (Exposure to light).

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Examination request: None

Number of Claims: 1

(2 of total 5 pages)

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[Title of Invention] LIGHT SOURCE APPARATUS FOR CURING
PHOTOPOLYMERIZATION-TYPE RESIN

(57) [Abstract]

[Object] The object of the present invention is to provide a compact, lightweight and safe light source for curing a photopolymerization-type resin that provides for sufficient polymerization of the photopolymerization-type resin without the degradation of the light source and thermal problems.

[Structure] The light source comprises a plurality of LEDs (light-emitting diodes) 3 that emit light with a peak wavelength within a range from 430 to 480 nm and optical fibers 4 which represent optical system means for gathering light emitted by the LEDs 3 and which are bundled at one end to form a light illumination head 5. A photopolymerization-type resin is illuminated with light output from the light illumination head 5.

A - power source; B - resistor; C - light illumination head; D - illumination window; E1 - optical fiber; E2 - (illegible)

[Field of Industrial Utilization]

The present invention relates to a light source apparatus for curing photopolymerization-type resins used as dental materials.

[Operation]

Light emitted by light-emitting diodes is gathered in a light illumination head with optical system means. This light is output via the light illumination head from an illumination window located at the other end of the light illumination head. A photopolymerization-type resin coated on the affected area is polymerized by illumination with this output light.

[Patent Claim]

[Claim 1] A light source apparatus for a photopolymerization-type resin characterized by the fact that it comprises a plurality of light-emitting diodes with a peak wavelength of emitted light within a range from 430 to 480 nm, an optical system means that gathers light of these light emitting diodes, and a light illumination means that outputs the light gathered by this optical system means.

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[Brief Description of the Drawings]

Fig 1 is a block diagram illustrating a schematic structure of the light source apparatus for curing photopolymerization-type resins, which is an embodiment of the present invention. This figure illustrates an example when optical fibers were used.

Fig 2 is a block diagram illustrating a schematic structure of the light source apparatus for curing photopolymerization-type resins, which is another embodiment of the present invention. This figure illustrates an example when a condensing lens was used as a condensing optical system.

Fig 3 is a block diagram illustrating a schematic structure of the light source apparatus for curing photopolymerization-type resins, which is an embodiment of the present invention. This figure illustrates an example when a concave mirror was used as a condensing optical system.

Fig 4 illustrates the relation between light spectrum obtained in the conventional light source apparatus, light spectrum obtained in the light source apparatus which is an embodiment of the present invention, and an absorption wavelength band of camphorquinone.

Fig 1

F – power source; G – resistor; H – (illegible); I – optical fiber; J – light illumination head; K – illumination window

Fig 2

P – condensing lens; Q – (illegible); R – inlet window (illegible); S – light illumination head

Fig 3

Fig 4

L – light output; M – CQ absorption wavelength band; N – [A, B, C, D] – conventional light source apparatus, [E] – invention light source apparatus; O – wavelength (nm)